

WH : Add <sup>or subtract</sup> the fraction

$$1) \frac{2 \cdot 4}{7 \cdot 4} + \frac{3 \cdot 7}{4 \cdot 7} = \frac{8}{28} + \frac{21}{28} = \boxed{\frac{29}{28}}$$

~~$\frac{30}{15} = 2$~~

$$2) \frac{3}{5} \cdot \frac{3}{3} - \frac{8 \cdot 5}{3 \cdot 5} = \frac{9}{15} - \frac{40}{15} = \boxed{-\frac{31}{15}}$$

## Adding / Subtracting Rational Functions

Ex |  $\frac{7}{4x} + \frac{3}{4x} = \frac{\overset{5}{\cancel{10}}}{\underset{2\cancel{4}}{x}} = \boxed{\frac{5}{2x}}$

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Ex |  $\frac{2x}{x+6} - \frac{5}{x+6} = \boxed{\frac{2x-5}{x+6}}$

Ex |  $\frac{7}{9x^2} + \frac{x}{3x^2+3x}$

① Find a common denominator

- Factor each denominator.

- Multiply each fraction by "missing parts" to get common denominator

$$\boxed{9x^2 \cdot (x+1)} = \underline{9x^3 + 9x^2}$$

$$3x^2 + 3x = \underline{3x(x+1)} \cdot \underline{3x}$$

$$\underline{9x^2(x+1)} = \underline{9x^3 + 9x^2}$$

$$\frac{(x+1)7}{(x+1)9x^2} + \frac{x(3x)}{3x^2+3x(3x)}$$

$$\frac{7x+7}{9x^3+9x^2} + \frac{3x^2}{9x^3+9x^2} =$$

$$\boxed{\frac{3x^2 + 7x + 7}{9x^3 + 9x^2}}$$

$$\frac{x-2}{2x-2} - \frac{-2x-1}{x^2-4x+3}$$

Common Denominator  
factored

multiplying by  
↓

$$2x-2 = 2(x-1)(x-3)$$

$$x^2-4x+3 = (x-1)(x-3) \cdot 2$$

$$\frac{x-2}{2x-2} - \frac{-2x-1}{x^2-4x+3}$$

$$\boxed{\frac{(x-3)(x-2)}{(x-3)2(x-1)} - \frac{(-2x-1)(2)}{(x-1)(x-3)(2)}}$$

1st half

$$\frac{x^2 - \cancel{2x}^{-5x} + 6}{2(x-3)(x-1)} - \frac{(-4x-2)}{2(x-3)(x-1)}$$

$$\frac{x^2 - 5x + 6 - (-4x - 2)}{2(x-3)(x-1)}$$

$$\frac{x^2 - 5x + 6 + 4x + 2}{2(x-3)(x-1)} =$$

$$\boxed{\frac{x^2 - x + 8}{2(x-3)(x-1)}}$$



Check if you can  
factor numerator.

Ex |  $\frac{7 \cdot 3}{7 \cdot 4x} - \frac{1 \cdot 4x}{7 \cdot 4x} = \frac{21}{28x} - \frac{4x}{28x}$

Common denominator

$$4x \cdot 7 = 28x$$

$$7 \cdot 4x = 28x$$

$$= \boxed{\frac{21 - 4x}{28x}}$$

$$\frac{x}{x^2 - x - 12} + \frac{5}{12x - 48}$$

$$x^2 - x - 12 = (x+3)(x-4) \cdot 12$$

$$12x - 48 = 12(x-4)(x+3)$$

$$\frac{12x}{12(x+3)(x-4)} + \frac{5(x+3)}{12(x-4)(x+3)}$$

$$\frac{12x}{12(x+3)(x-4)} + \frac{5x+15}{12(x+3)(x-4)}$$

$$\frac{17x + 15}{12(x+3)(x-4)}$$

✓✓

$$\frac{\overbrace{(x+6)}^3}{(x+6)(x+4)} - \frac{1 \cdot \overbrace{(x+4)}^1}{(x+6)(x+4)}$$

$$\frac{3x+18}{(x+6)(x+4)} - \frac{x+4}{(x+6)(x+4)}$$

↗ Have to Do!

$$\frac{3x+18 - \overbrace{(x+4)}^1}{(x+6)(x+4)} = \frac{3x+18-x-4}{(x+6)(x+4)}$$

$$= \frac{2x+14}{(x+6)(x+4)} = \boxed{\frac{2(x+7)}{(x+6)(x+4)}}$$

$$\begin{aligned}
 \textcircled{1} \quad \frac{4 \cdot 8}{4 \cdot 3x^2} - \frac{5 \cdot 3x}{4x \cdot 3x} &= \frac{32}{12x^2} - \frac{15x}{12x^2} \\
 &= \boxed{\frac{32 - 15x}{12x^2}}
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{2} \quad \frac{(x-4)(x-4)}{(x-4)5 \cdot x} - \frac{12 \cdot x}{5 \cdot (x-4) \cdot x} \\
 = \frac{x^2 - 8x + 16}{5x(x-4)} - \frac{12x}{5x(x-4)}
 \end{aligned}$$

$$= \frac{x^2 - 8x + 16 - 12x}{5x(x-4)}$$

$$= \boxed{\frac{x^2 - 20x + 16}{5x(x-4)}}$$



$$\frac{1}{2} + \frac{3}{2} = \frac{4}{2}$$

$$\begin{array}{r} \cancel{x^2} + 4x + 2 \\ \hline \cancel{x^2} + 3x \end{array}$$

$$\begin{array}{l}
 \underline{30} \quad \left( \frac{x^2 + 3x - 4}{x^2 + 4x + 4} \right) \cdot \left( \frac{2x^2 + 4x}{x^2 - 4x + 3} \right) \\
 \quad \quad \quad \downarrow \\
 \quad \quad \quad \frac{(x+4)\cancel{(x-1)} \cdot 2x\cancel{(x+2)}}{\cancel{(x+2)}(x+2) \cdot \cancel{(x-1)}(x-3)}
 \end{array}$$

$$\boxed{\frac{2x(x+4)}{(x+2)(x-3)}}$$

P 586 | #19-24 → Show work if you're going to ask a ?

Remember ∴ Start by factoring the denominator.

- Then get common denominator
- Distribute the negative when subtracting

$$\begin{array}{r} \text{Ex)} \quad \frac{2}{x+4} - \frac{3x+5}{x+4} \end{array}$$